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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,520	06/19/2003	Shizhong Liu	MCS-005-03 (303702.01)	8588

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EXAMINER
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CZEKAJ, DAVID J

ART UNIT	PAPER NUMBER
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2621

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/600,520	<b>Applicant(s)</b> LIU ET AL.	
	<b>Examiner</b> DAVID CZEKAJ	<b>Art Unit</b> 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 12-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

On pages 3-4, applicant argues that Tomizawa fails to disclose storing the error value to a database then retrieving the error value instead of re-computing the value. While the applicant's points are understood, the examiner respectfully disagrees. See for example Tomizawa column 9, lines 39-45. There Tomizawa discloses storing the error values thus saving the amount of calculating operations. Since Tomizawa saves the number of calculations, the error values are retrieved instead of being re-computed. The affine transformations of the triangle areas are the way the error values are computed, and then subsequently are stored. Therefore the rejection has been maintained.

On pages 4-5, applicant argues that Ma fails to disclose a second level, identification, or evaluation using the irregular MV's. While the applicant's points are understood, the examiner respectfully disagrees. See for example Ma column 10, lines 60-65. There Ma discloses determining true MV's from irregular MV's. Ma further discloses in column 11, lines 30-35, a second level involving the use of the irregular MV's. Therefore the rejection has been maintained.

On pages 6-10, applicant argues that the combination of Straasheijm, Ma, and Tomizawa teach away from the claimed invention. While the applicant's points are understood, the examiner respectfully disagrees. Ma teaches in column 8, lines 1-5, the comparison of a matching error with a threshold. If the comparison indicates a no-motion region, the search is stopped. However, if the comparison does not indicate a

no-motion region, the search is continued just as the search in Straasheijm and Tomizawa is continued. Furthermore, under KSR, all the elements are known, could have been combined without any change of function, and would give predictable results. Thus, this is simply a modification of equivalent parts, not a teaching away

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The specification on page 10 indicates the use of a carrier wave which is directed towards non-statutory subject matter which needs to be removed from the specification.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-4, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Straasheijm (6968009) in view of Ma (7072398) in further view of Tomizawa (6208690).

Regarding claim 1, Straasheijm discloses an apparatus that relates to a method of finding motion vectors (Straasheijm: column 1, lines 10-14). This

apparatus comprises “evaluating a first set of zero valued motion vectors” (Straasheijm: figure 5; column 4, lines 5-10, wherein the first set is the rough search which finds the rough motion vectors), “evaluating a second set of candidate MV’s for each block in the frame based on the first set” (Straasheijm: figure 5; column 4, lines 42-45, wherein the second set is the search performed in the half-scaled frame), “evaluating a third set of MV’s for all blocks in the image based on either the first or second set of MV’s” (Straasheijm: figure 5; column 4, lines 47-54, wherein the third set is the third search performed on the full frame), and “outputting an optimal motion vector” (Straasheijm: figure 5, wherein the optimal MV is the final MV). However, this apparatus lacks computing the reliability and using spatial, temporal, and block-based search pattern and the storage as claimed. Ma teaches that fast motion search algorithm is indispensable to the realization of real-time communication services (Ma: column 2, lines 23-26). Ma discloses an apparatus that determines a “reliability of each MV” (Ma: column 8, lines 1-5, wherein the reliability is the matching error), “evaluating MV’s using spatial and temporal neighbors” (Ma: column 8, lines 25-29), and “using a block-based searching pattern” (Ma: column 5, lines 35-38, wherein the pattern is the diamond pattern). Tomizawa teaches that storing error values to a database the first time the MV is evaluated and then retrieving the error values instead of re-computing them reduces the number of transformations needed and eliminates the need for repeating searching motion vectors thus improving the efficiency of processing (Tomizawa: column 9, lines

39-45). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to take the apparatus disclosed by Straasheijm, add the processing taught by Ma, and add the storage taught by Tomizawa in order to obtain apparatus that more easily applies a fast matching algorithm to image frames.

Regarding claim 2, Ma discloses “the reliability is determined by computing error values for each block in the frame and comparing the error values to a threshold “ (Ma: column 8, lines 1-5).

Regarding claim 3, Ma discloses “each block having a error value less than a first threshold is deemed to have a reliable MV” (Ma: column 8, lines 1-5; column 9, lines 30-32, wherein the reliability are the categories no motion, more, or less which indicate the degree of reliability).

Regarding claim 4, Ma discloses “the optimal MV is determined by computing error values and selecting a MV having the smallest value” (Ma: column 7, lines 28-34).

Regarding claim 6, Straasheijm in view of Ma disclose “a second error threshold is computed as a minimum error value of the spatial and temporal neighbor blocks” (Straasheijm: figure 5; Ma: column 8, lines 25-29).

Regarding claim 9, Ma discloses “the pattern search is a diamond search” (Ma: column 5, lines 35-38).

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Straasheijm (6968009) in view of Ma (7072398) in further view of Tomizawa (6208690) in further view of Yang (6990148).

Regarding claim 5, note the examiners rejection for claim 1, and in addition, claim 5 differs from claim 1 in that claim 5 further requires comparing the MV's with a second threshold in which Yang teaches in figures 7, 9, and 11-14). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to implement the optimal MV determined using a second threshold in order to more accurately determine the optimal motion vector.

3. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Straasheijm (6968009) in view of Ma (7072398) in further view of Tomizawa (6208690) in further view of Yang (6990148) in further view of Kim (6947603).

Regarding claim 7, note the examiners rejection for claim 1, and in addition, claim 7 differs from claim 1 in that claim 7 further requires comparison with a third threshold. Kim teaches that current motion algorithms require a huge amount of calculation (Kim: column 1, lines 30-35). To help alleviate this problem, Kim discloses an apparatus comprising "if the error value is larger than a threshold, the set of MV's comprises the entire search range and if the value is smaller, the set of MV's comprises the immediate neighbor MV's" (Kim: figures 1-2; column 4, lines 38-60; column 5, lines 12-24). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made

to implement the comparison taught by Kim in order to obtain an apparatus that helps reduce the amount of calculations needed for determining a reliable MV.

Regarding claim 8, Yang discloses “the threshold is computed as a max of the computed error values of the neighbor blocks” (Yang: figures 9 and 13).

4. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Straasheijm (6968009) in view of Ma (7072398) in further view of Tomizawa (6208690) in further view of Carr (6118823).

Regarding claim 10, note the examiners rejection for claim 1, and in addition, claim 10 differs from claim 1 in that claim 10 further requires an array of error values. Carr teaches that the use of an error array enhances system performance (Carr: column 3, lines 1-6). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to implement the error array taught by Carr in order to enhance the overall system performance.

Regarding claim 11, Carr discloses “if an error value has already been computed, it is read back from the array” (Carr: column 2, line 62- column 3, line 6, wherein the array is read from and wrote to).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID CZEKAJ whose telephone number is (571)272-7327. The examiner can normally be reached on Mon-Thurs and every other Friday.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dave Czekaj/  
Primary Examiner, Art Unit 2621